

EJ1N-HFU-ETN Ethernet/IP Interface

Operation Manual

ENGLISH



H13E-EN-01

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1 Introduction

The EJ1N-HFU-ETN enables remote communication with multiple EJ1N-TC2 Temperature Controllers (TCs) through Profinet IO or Ethernet/IP network. This allows for control operation, monitoring the process values and writing parameters of up to 24 Temperature Controllers.

This document will introduce configuration and operation of the EtherNet/IP interface of the EJ1N-HFU-ETN.

The EDS file provided with the Unit supports the following functions:

1. Set the specific sizes of the cyclic input and output buffers
2. Allocate the cyclic IO data in a flexible way
3. Configure the Temperature Controllers
4. Set the Temperature Controller parameters to backup and restore

Please be sure to read the related manuals to use the EJ1N-HFU-ETN Unit safely and properly.

Reference	Name	Cat. No.
[1]	EJ1 Modular Temperature Controllers User's Manual	H142
[2]	NJ-series CPU Unit Built-in Ethernet/IP Port User's Manual	W506

2 EJ1N-HFU-ETN Specifications

Item		Specification
Installation	Unit Type	Ethernet Gateway (Profinet IO and Ethernet/IP) to EJ1N Temperature Controllers
	Model	EJ1N-HFU-ETN
	Dimensions (WxHxD)	31mm x 90mm x 72mm
	Weight	170g
Environment	Ambient operating temperature	-10 °C to 55 °C
	Ambient operating humidity	25% to 85%
	Ambient storage temperature	-20 °C to 65 °C
EtherNet Interface	Communications protocol	EtherNet/IP
	Communication ports	3
	Communication speed	100 Mbps
	Supported Assemblies	Basic I/O (Input assembly 100, Output assembly 110)
	Default IP address	192.168.0.4
Modbus-RTU Interface	Modbus node range	01 to 24
	Communication settings	Fixed to 38400, 8, E, 1
	Compatible TCs	EJ1N-TC2

3 EJ1N-HFU-ETN Configuration

Use the following procedure to prepare the Unit for use. Refer to the reference sections for details on the indicated steps.

Step	Item	Section**
1	Connect the Unit, the Temperature Controllers and the End Unit.	[1], section 2
2	Connect the power supply.	[1], section 2
3	Wire the Temperature Controllers.	[1], section 2
4	Set the communications unit numbers of the Temperature Controllers.	[1], section 1.1.4
5	Select EtherNet/IP interface for the Unit	3.2 Enable EJ1N-HFU-ETN EtherNet/IP interface
6	TC: Set the communication settings of the Temperature Controllers	3.4 TC: Setting TC communication settings
7	Set-up the Ethernet Network	[2], section 2
8	Turn ON the power to the End Unit	-
	Operate the following steps from the Configurator*	-
9	Install the EDS file*	3.1 Install EDS file
10	Optionally: Reset Unit's settings to default	3.3 Reset Unit settings
11	Set the IP address of the Unit	3.5 Setting EJ1N-HFU-ETN IP address
12	EDS: Select the allocated Temperature Controllers	3.6.1 Unit Allocation
13	EDS: Configure the input and output buffer sizes	3.6.2 Input and Output Buffer size
14	EDS: Set the Modbus RTU timeout and retry values	3.6.3 Modbus timeout and retry
15	EDS: Allocate the detailed input and output buffer data	3.6.4 Input and Output Allocation
16	EDS: Set the Temperature Controller parameters	3.6.5 Temperature Controller Parameters
17	EDS: Set the parameters for backup and restore	3.6.6 Parameters for backup and restore
18	Tag Data Links and Start remote I/O communications	[2], section 7
19	Send Explicit messages	EtherNet/IP Explicit Messages

* Operations described using OMRON Network Configurator for EtherNet/IP software.

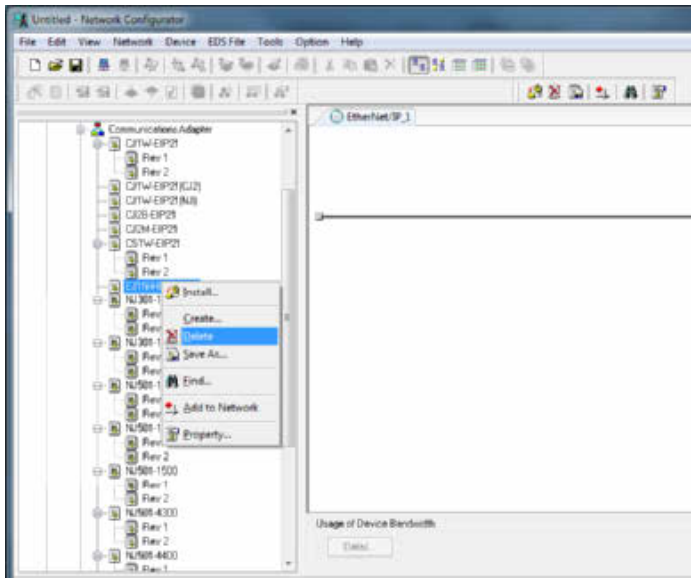
** The references are listed below

Reference	Name	Cat. No.
[1]	EJ1 Modular Temperature Controllers User's Manual	H142
[2]	NJ-series CPU Unit Built-in Ethernet/IP Port User's Manual	W506

3.1 Install EDS file

Follow the steps below to install (a new version of) an EDS file within Network Configurator.

1. Delete the old EDS file (see below picture).

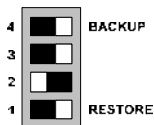


2. Install the new EDS file (EJ1-EIP.eds) using the EDS File ~ Install menu item.

Please check [2], section A-2-1 for detailed information about installing EDS files.

3.2 Enable EJ1N-HFU-ETN EtherNet/IP interface

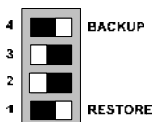
Select the EtherNet/IP interface for the Unit by setting the dip switch no 2 (second from the bottom) to ON and power ON the Unit (see below).



Pin 2	Interface setting
OFF	Profinet IO and Modbus TCP active
ON	EtherNet/IP active

3.3 Reset Unit settings to factory default

Set the dip switch no 3 (second from the top) ON at power up to reset all Unit's settings back to factory default. This includes the IP address, which will be set back to 192.168.0.4.



Pin 3	Interface setting
OFF	No action
ON	Reset Unit settings (including IP address) to factory default at power up.

Follow this procedure:

1. Make sure that the Unit is in Ethernet/IP interface operation (dip switch no 2 = ON)
2. Toggle dip switch no 3 to ON position
3. Power the Unit power briefly OFF and ON again
4. The Unit starts removing the configuration from memory. When it has finished the **TS** Red and Green LEDs will be blinking at the same time
5. Toggle again dip switch no 3 to OFF position

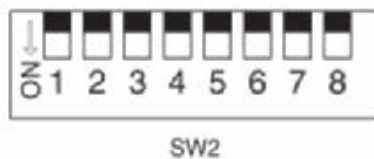
After a complete reset the EJ1N configuration is no longer valid. All the TCs are disabled, no cyclic data is mapped and all the channel parameters are set to 0. The **TS** Red and Green LEDs will be blinking at the same time to show this status.

It is necessary to send a new valid configuration to be able to operate the Unit.

3.4 TC: Setting TC communication settings

Please refer to section 7.1 of EJ1 Modular Temperature Controller manual (H142) [1] for details about the communication settings on the Temperature Controllers.

Follow the steps below to set the communication settings correctly using the dip switches SW2 of all the TC modules (EJ1N-TC2):



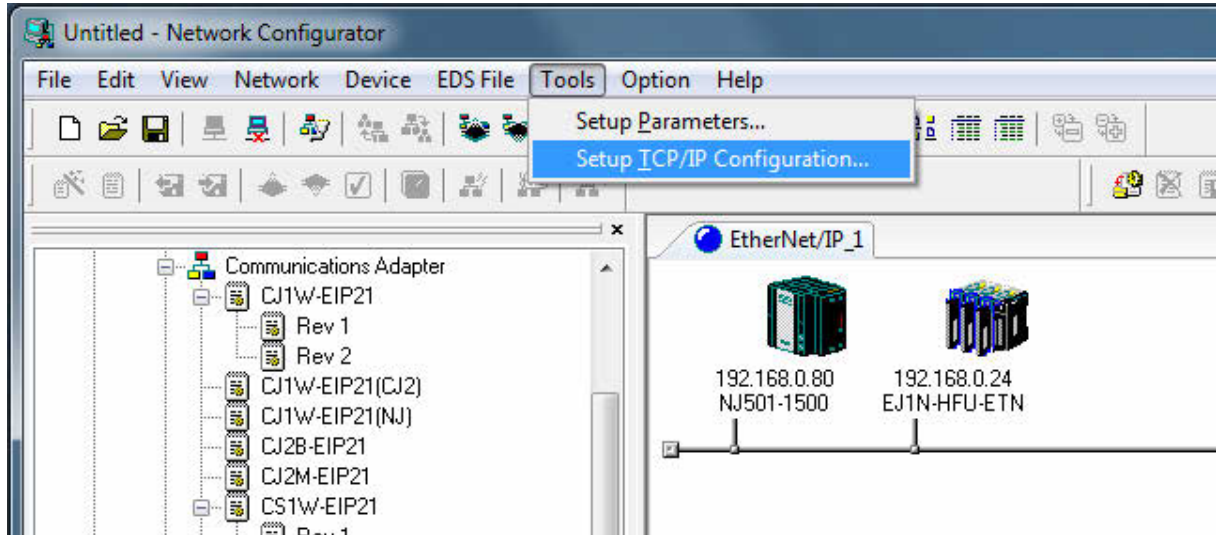
EJ1□-TC Basic Units

SW2	Meaning
3 V1.2	Set to ON when using the Modbus communications protocol for port B. OFF: The setting of the Port B Communications Protocol parameter is used (default: CompoWay/F). ON: Modbus is used.
4 to 5 V1.2	Set the baud rate of port B. 4 = OFF, 5 = OFF: The setting of the Port B Communications Baud Rate parameter is used (default: 9.6 kbps). 4 = ON, 5 = OFF: 19.2 kbps 4 = OFF, 5 = ON: 38.4 kbps 4 = ON, 5 = ON: 115.2 kbps

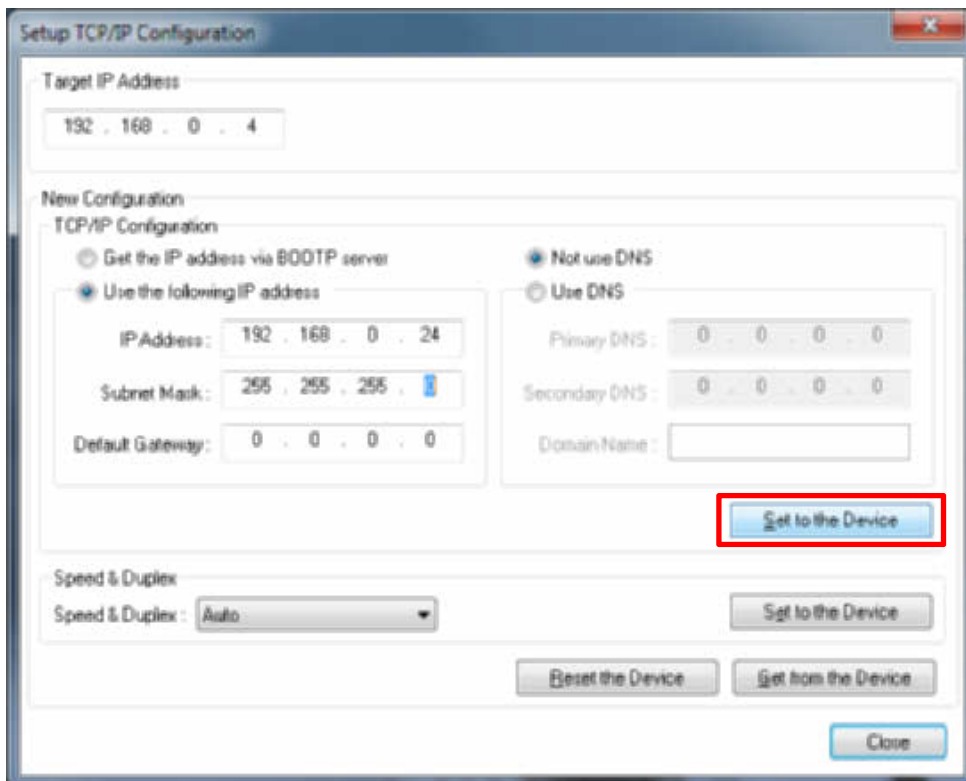
3.5 Setting EJ1N-HFU-ETN IP address

Perform the following steps to change the IP address of the Unit. The factory default IP address is 192.168.0.4.

1. Open Network Configurator
2. Select the Tools ~ TCP/IP Configuration menu item



3. Fill in the details of the new IP address



4. Click Set to the Device button

After a power toggle, the new IP address will be active in the Unit.

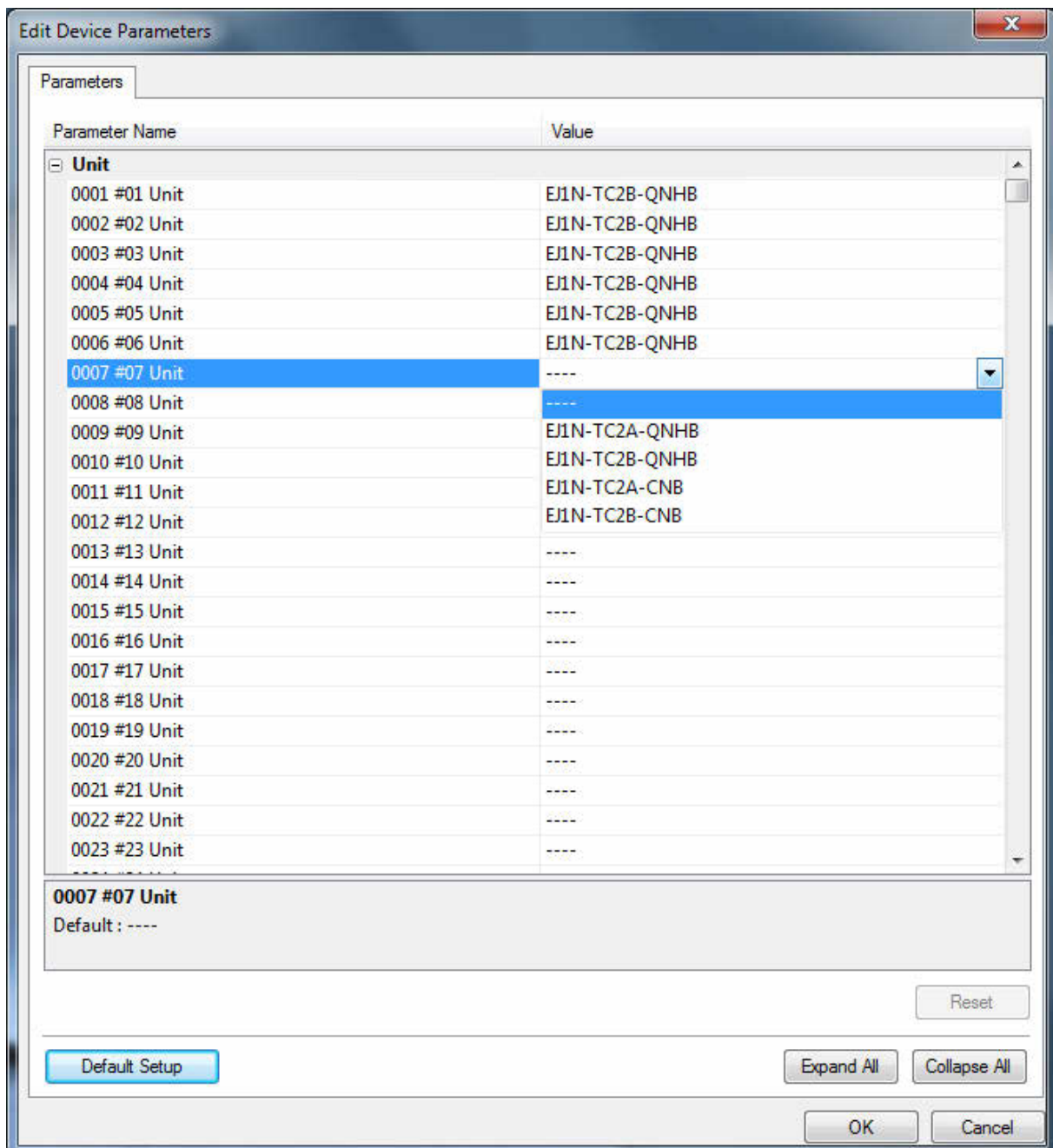
3.6 Setting up the Unit for Ethernet/IP

The Network Configurator software allows configuration of different settings related to the Unit and the Temperature Controllers.

Set the parameters of the EJ1N-HFU-ETN Unit as described in the following sections and download it to the physical unit using Network Configurator.

3.6.1 Unit Allocation

Select the Temperature Controllers which are connected to the Unit when double-click is done on the EJ1N-HFU-ETN module.



Make sure the Modbus node address (#01 to #24) corresponds to the node setting on the Temperature Controllers (SW1).

Enable and disable TC units by using Unit allocation

The Unit allocation parameters can be used to enable and disable TC units without changing the detailed input and output allocation.

In case a particular TC / node is not installed in the machine, perform the following steps will configuring in the Network Configurator:

1. Disable the TC unit by setting the #xx Unit from the Unit Allocation back to default (“---”).
2. Keep the other detailed input and output allocation mapping as is (no need to remove the detailed I/O words for this node).
3. Perform a software reset of the coupler (automatically done in the Network Configurator after download).
4. The coupler will not communicate with the disabled TC unit.

Reverse the steps to enable the Temperature Controller again if necessary. The steps can also be done using explicit messaging (not using Network Configurator) by using the Unit Allocation Object (see section A.3 Unit Allocation Object (Class 0x72)).

Please note:

- Any changes to these parameters will always require a (software) reset for the changes to be applied. Do not use power toggle!
- The parameters of a disabled TC unit are not uploaded or downloaded.

3.6.2 Input and Output Buffer size

Set the Input and Output buffer size using the following two parameters (see also picture above):

Parameter	Description
TC Output Size	The size of the EJ1N-HFU-ETN Output buffer (in bytes). Range 2 to 400 bytes.
TC Input Size	The size of the EJ1N-HFU-ETN Input buffer (in bytes). Range 2 to 400 bytes.

Please note that one single Temperature Controller register consists of 2 bytes.

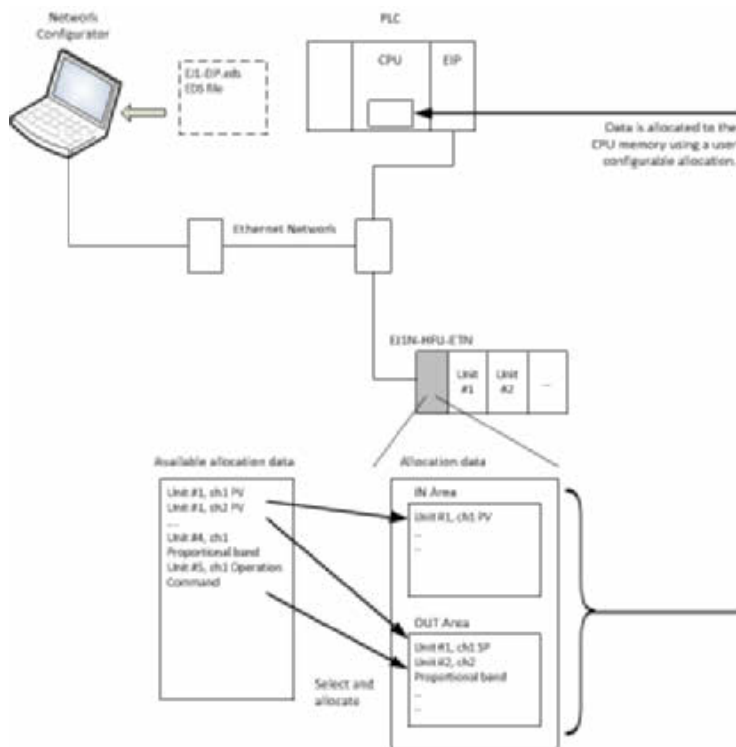
3.6.3 Modbus timeout and retry

Set the Modbus communication settings using the following two parameters:

Parameter	Description
Modbus Timeout	The response timeout (in milliseconds) of the Modbus RTU interface to the TCs. Range 100 to 65535 ms.
Modbus Retries	The amount of retries before error indication. Range 0 to 8 retries.

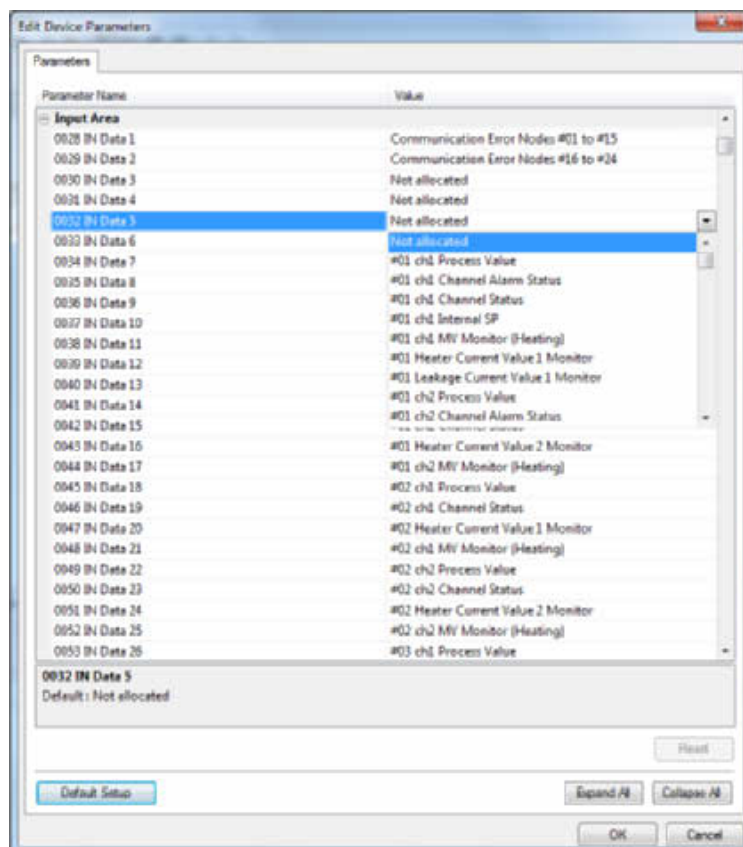
3.6.4 Input and Output Allocation

For each word of the Input and Output buffer, a specific register can be allocated for one of the Temperature Controllers.

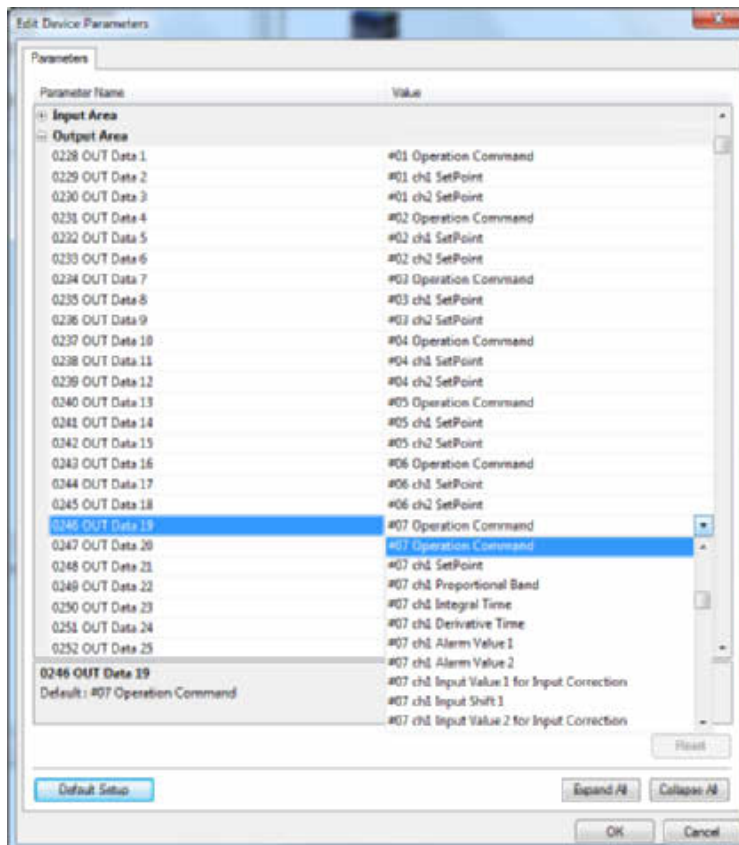


Use Network Configurator to configure the required data for each of the input and output buffer words:

Input



Output

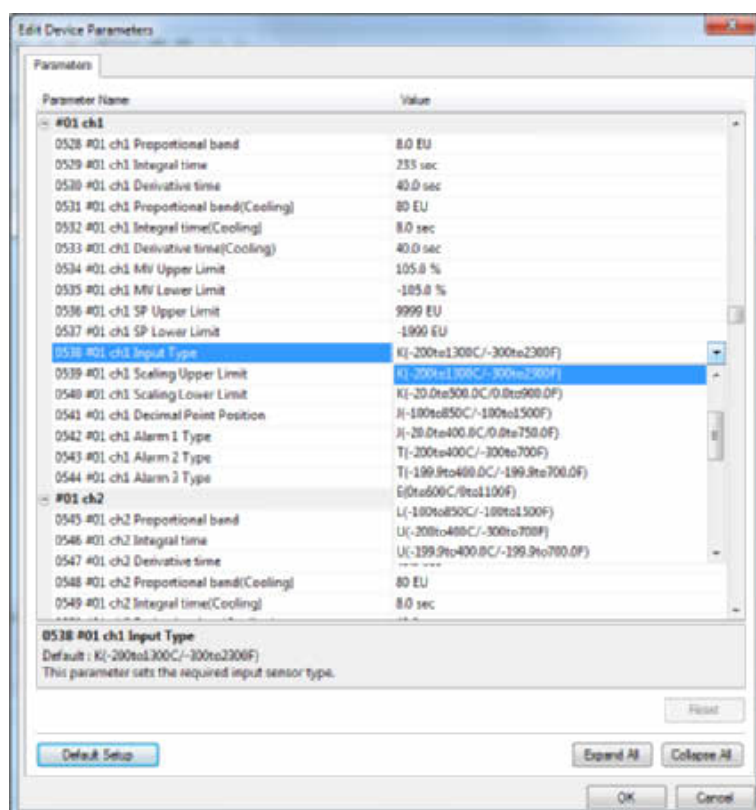


Notes:

1. Be sure to put all unused IO allocation (outside the IO buffer) to 'Not allocated'. Not doing so will affect Modbus RTU cycle.
2. The EJ1N-HFU-ETN requires a software reset in order for the new parameter settings to take effect.

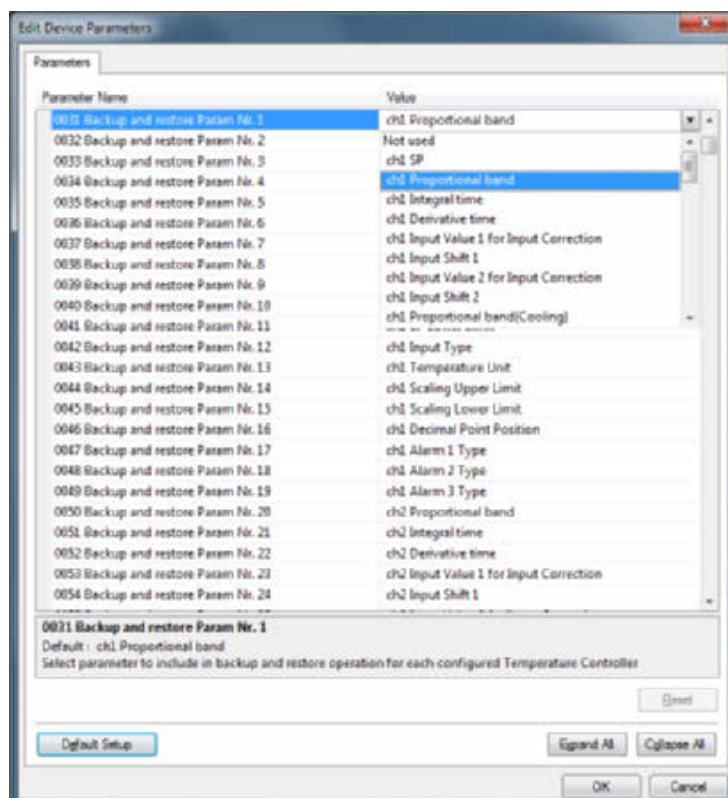
3.6.5 Temperature Controller Parameters

The Network Configurator software can also be used to set detailed parameters for the connected Temperature Controllers (see below).



3.6.6 Parameters for backup and restore

The Network Configurator is used to set the detailed parameters for the backup and restore function. Be sure to set the parameters before performing the backup operation.



The details about the backup and restore functionality can be found in section 5.3 Backup and restore.

3.6.7 Downloading the configuration to the devices

After all configuration is done, it is necessary to download it to the devices, that is the PLC (NJ/CJ CPU) and the EJ1N itself. It is possible to do so one at a time (right click over the graphical nodes and select Parameter > Download option) or in one shot using the Download to Network icon



in the toolbar.



Be sure to set all connected TCs to STOP mode before downloading the parameters.

Downloading a configuration that writes data to a TC that is in RUN mode will fail with a vendor specific error code.

3.6.8 Uploading the configuration from the devices

There is an important remark regarding uploading the configuration from the EJ1N Temperature Controllers to the Network Configurator. When a TC is marked as disabled in the configuration (and this configuration is sent to the EJ1N), the upload will make unusable the data for this particular TC.

The reason is that all requests for reading parameters of a disabled TC will end up in an “empty data” response. This “empty data” value results in value 0 in the parameters, which for some parameters is a value out of range. When this TC is enabled and the complete configuration is downloaded to the EJ1N, this download operation will fail.

Two additional remarks:

- This behavior does not have influence on the enabled Temperature Controllers in any way.
- After uploading pay special attention when adding (enabling) an additional Temperature Controller in the configuration. Be sure all parameters of this TC have been set properly before downloading.

4 EJ1N-HFU-ETN LED Status

The following table shows the meaning of the LED indicators.



Indicator	Status	Meaning
RUN	Green	Normal operating status
	Blinking	The Unit is initialising
	Off	
ERR	Red	The product detected an error and cannot continue
	Off	Normal operating status
COMM	Green	An Ethernet/IP master connection established
	Off	No Ethernet/IP master connection established The Unit is in Backup or Restore mode
BF	Red	No Ethernet link detected and/or the Unit does not have a valid IP address
	Off	Normal operating status
TS	Green	All configured Temperature Controllers are communicating
	Green Blinking	First communication cycle with Temperature Controllers in progress Backup and restore operation in progress
	Red	Communication failure with all Temperature Controllers
	Red Blinking	Communication failure with at least one Temperature Controller Backup and restore operation failed
	Green and Red Blinking	The reset configuration procedure has finished. The Unit does not contain valid configuration and the IP address is set to factory default value

5 EJ1N-HFU-ETN Operation

5.1 Communication Status

The following two communication status input words can be mapped to the Ethernet/IP input data.

Communication Errors Node #01 to #15

Bit	Name	Description
0	Comm Error	ON: At least one Temperature Controller (Unit Number #01-#24) is not communicating OFF: All Temperature Controllers (#01-#24) are communicating normally
01-15	Node Error	ON: Temperature Controller of Unit number (#01-#15) is not communicating OFF: Temperature Controller of Unit number (#01-#15) is communicating normally

Communication Errors Node #16 to #24

Bit	Name	Description
00-08	Node Error	ON: Temperature Controller of Unit number/Modbus node (#16-#24) is not communicating* OFF: Temperature Controller of Unit number (#16-#24) is communicating normally*

*Bits 0 to 8 correspond to Temperature Controller of Unit number #16 to #24

5.2 TC Operation Commands and Status

Operation Commands

The EJ1 Operation Manual (reference [2] Section 7.5.3) explains how to control the Temperature Controller using the Modbus protocol. Map the Operation Command output word for each Unit (#01 to #24) to control the Temperature Controller.

When executing the operation command, place the command code in the upper byte of the write data and place the TC related information in the lower byte.

Operation Command	Command Code	TC related information
Write Mode	04	00: Backup 01: RAM
Software Reset	06	Always 00
RUN	0A	00: Channel 1
STOP	0B	01: Channel 2
Manual	0C	02: Channel 3
Auto	0D	03: Channel 4
40% AT Execute	0E	FF: All channels
100% AT Execute	0F	
AT Cancel	10	
Bank 0 Change	1E	
Bank 1 Change	1F	
Bank 2 Change	20	
Bank 3 Change	21	
Local SP Change	22	

Operation Command	Command Code	TC related information
Remote SP Change	23	
Reset Error	2D	Always 00
Alarm 1 Latch Cancel	32	00: Channel 1 01: Channel 2 02: Channel 3 03: Channel 4 FF: All channels
Alarm 2 Latch Cancel	33	
Alarm 3 Latch Cancel	34	
All Alarm Latch Cancel	35	
Save RAM Data	37	Always FF
Set value initialization	38	Always 00
Save RAM Data 2	39	Always FF
Register Unit Configuration	3B	00: Reset 01: Register

Channel Status

The detailed channel status for each channel is listed below.

Bit position	Status	Bit description		Meaning
		0	1	
Bit 0	RUN/STOP	Run	Stop	Run/Stop can be confirmed.
Bit 1	Auto/Manual	Auto	Manual	Auto/Manual can be confirmed
Bit 2	AT Execute/Cancel	AT is stopped	AT execution in progress	Can confirm AT Execute/Cancel.
Bit 3	SP Mode	LSP	RSP	SP mode can be confirmed
Bit 4	ST (V1.2)	ST is stopped	ST is executing	ST Execute/Stop status can be checked.
Bit 5	SP Ramp (V1.2)	OFF	Ramp is executing	SP Ramp status can be checked.
Bit 6	Not used.			
Bit 7	Not used.			
Bit 8	Input Error	No error	Error	An input error has occurred.
Bit 9	RSP Input Error	No error	Error	An RSP input error has occurred.
Bit 10	Not used.			
Bit 11	Not used.			
Bit 12	Not used.			
Bit 13	Not used.			
Bit 14	Not used.			
Bit 15	Not used.			

5.3 Backup and restore

The network consists of the Ethernet/IP Master Unit and the Slave Units. The entire network is affected when a Unit is faulty, so a faulty Unit must be repaired or replaced quickly.

The EJ1N-HFU-ETN Unit has a backup and restore function that can read or write the setting parameters of all the Temperature Controllers connected to the Unit as a batch. The setting parameters are stored in the EJ1N-HFU-ETN Unit.

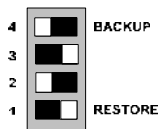
The specific parameters which will be part of the backup and restore can be selected by the user. Please refer to section 3.6.6 Parameters for backup and restore for details.

Please note that both the backup and restore operation will interrupt the normal communication (both cyclic IO and explicit messaging). Be sure to have the application in a fail-safe state before executing these functions. Normal operation is not feasible during backup and restore operation.

Backup function

Use this function to upload the setting parameters from the Temperature Controllers to the EJ1N-HFU-ETN Unit. Perform the following steps:

1. Confirm there is no communication error on the Unit (TS indicator is Green). In case there is an error, please resolve this error before attempting to perform the backup function.
2. Turn ON pin 4 (Backup, at the top) of the DIP switch of the EJ1N-HFU-ETN Unit.
3. Power the Unit briefly OFF and ON again.
4. The Unit will start in backup mode, uploading the data from the enabled TCs and the TS indicator will flash green.



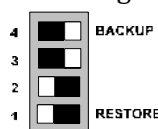
5. If the backup operation completes normally, the TS indicator status will return to be lit green.
If the backup operation fails, the TS indicator will flash red.
6. Turn OFF pin 4 after the operation.
7. Power the Unit briefly OFF and ON again to return to normal operation.

Restore function

Use this function to download the setting parameters from the EJ1N-HFU-ETN Unit to the Temperature Controllers. During the download operation, each of the Temperature Controllers will be reset after the setting parameters have been written.

Perform the following steps:

1. Confirm the execution conditions for restore have been met:
 - a. The faulty Temperature Controller has been replaced with a TC of the same model and communication settings (dip switches and node number).
 - b. There are no communication errors indicated by the EJ1N-HFU-ETN Unit (TS indicator is Green).
 - c. None of the Temperature Controllers are in RUN mode.
In case there is an error, please resolve this error before attempting to perform the restore function.
2. Turn ON pin 1 (Restore, at the bottom) of the DIP switch of the EJ1N-HFU-ETN Unit.
3. Power the Unit briefly OFF and ON again.
4. The Unit will start in restore mode, downloading the data to the TCs and the TS indicator will flash green.



5. If the restore operation completes normally, the TS indicator status will return to be lit green.
If the restore operation fails, the TS indicator will flash red.
6. Turn OFF pin 1 after the operation.
7. Power the Unit briefly OFF and ON again to return to normal operation.

Backup and restore troubleshooting

Perform the following checks in case of failure of the backup and restore operation:

- 1) Read out the B&R status CIP object (Class 0x74, Instance 0x01 and attribute 0x63) for detailed information on the failure. The value data is specified as

B&R status object	High word	Low word
Description	Failure Modbus node	Message error code (see Appendix A.4)

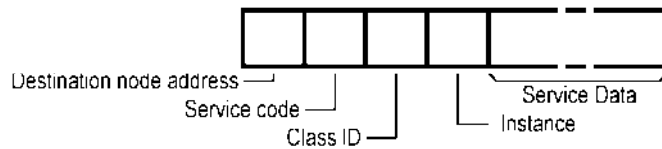
- 2) Confirm the faulty Temperature Controller has been replaced correctly with the same model and communication settings.
- 3) Confirm that in normal mode there are no communication errors indicated by the EJ1N-HFU-ETN Unit (TS indicator is Green). Resolve any issues before performing backup or restore
- 4) Confirm none of the Temperature Controllers are in RUN mode.
- 5) Confirm all configured Temperature Controllers are enabled using the Unit Allocation settings (see section 3.6.1). Disabled Temperature Controllers will not be part of the backup operation (and therefore restore operation)

Appendix A EtherNet/IP Explicit Messages

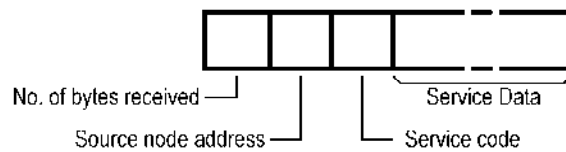
A.1 Basic Explicit Message

The basic format of each command and response is shown below.

Command:



Response:



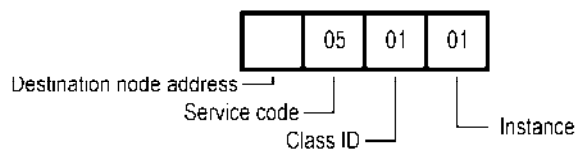
Service codes supported by the Unit are

Service	Read	Write	Reset
Command	0E Hex	10 Hex	05 Hex
Normal response	8E Hex	90 Hex	85 Hex

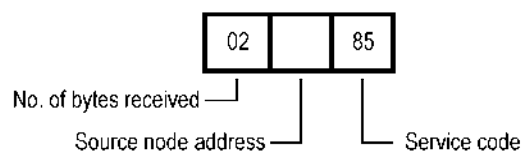
Example

The following command will reset the Unit.

Command:



Response:



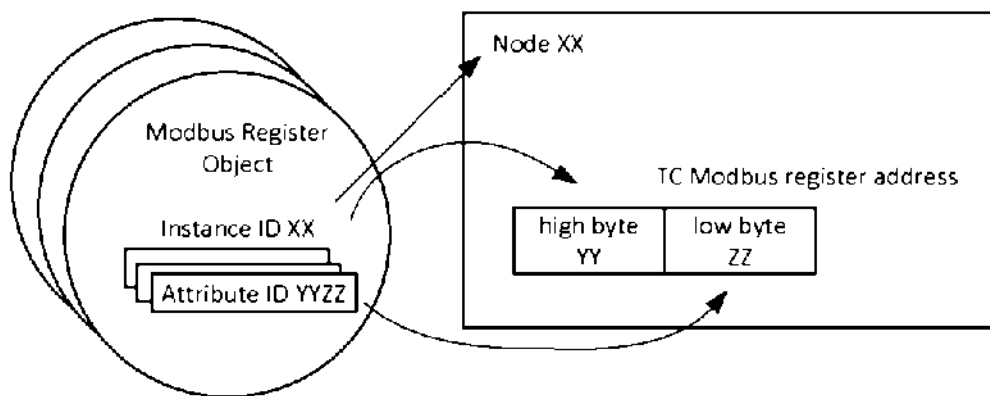
A.2 Modbus Register Object (Class 0x64)

Supported Service Codes

Service Code No. (hex)	Service
0E	Get attribute single
10	Set attribute single

Supported Instance and Attribute Codes

For this Object, the targeted Temperature Controller node and corresponding Modbus register are mapped to the object's Instance and attribute.

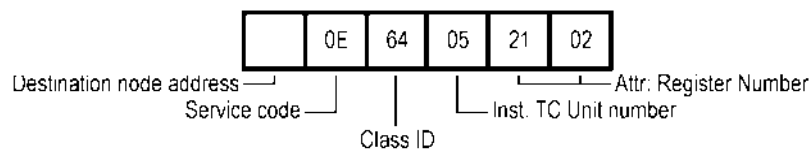


For the CIP object, the attribute value 0000 Hex cannot be used. In case of writing to Modbus address 0000 Hex, use attribute value FFFF Hex instead.

Example 1:

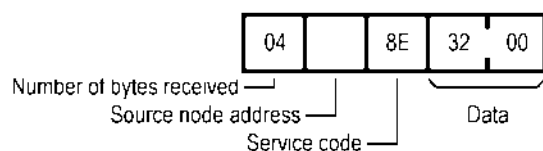
Read Leakage Current Value 1 Monitor (Modbus register 0221) of Temperature Controller unit #05.

Command:



Please note that the Register number value is swapped.

Response:

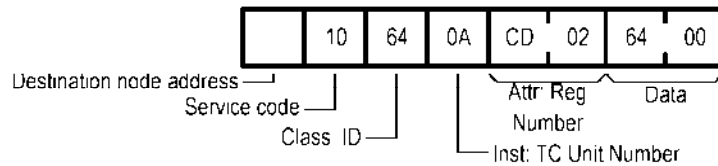


In this case the Leakage Current value is 5.0 A. Note that the data is swapped.

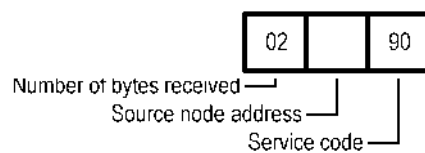
Example 2:

Write Present Bank Alarm Value 1 – CH1 (Modbus register 02CD) of Temperature Controller #10 (new value is 100 EU).

Command:



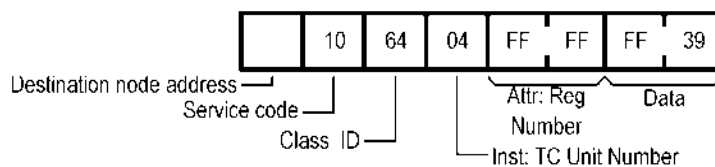
Response:



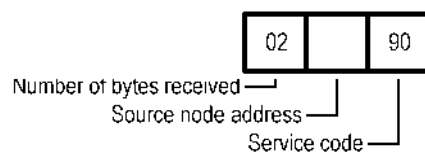
Example 3:

Write any new settings of the Temperature Controller #04 to non-volatile memory. Use attribute value FFFF Hex to write to Modbus register 0000 Hex.

Command:



Response:



A.3 Unit Allocation Object (Class 0x72)

Supported Service Codes

Service Code No. (hex)	Service
0E	Get attribute single
10	Set attribute single

Supported Instance and Attribute Codes

This CIP Object holds the list of enabled Temperature Controllers present on the system (as defined in section 3.6.1 Unit Allocation).

Class	Instance	Attribute	Value (decimal)	
72 Hex	TC number (#01 to #24)	64 Hex (Fixed)	0	Unit not present (disabled)
			769	EJ1N-TC2A-QNHB
			1025	EJ1N-TC2B-QNHB
			1281	EJ1N-TC2A-CNB
			1537	EJ1N-TC2B-CNB
			Others	Reserved, do not use

Use the explicit message as described above to enable or disable specific Temperature Controllers for your machines. After setting the parameters, be sure to send a software reset as described in section A.1 Basic Explicit Message.



Please note that writing these objects requires a software reset for the new value to take effect. Do not perform a power toggle after writing these values, as this may result in the changes being lost.

A.4 Explicit Message Error Codes

When an error response has been returned for the executed explicit message, the Unit can respond with the following error codes:

Write read only parameter

ERROR Vendor specific error					
VSE	CNT	Status Info1 (2000)		Status Info2 (0003)	
1F	02	00	20	03	00

Write parameter not allowed in RUN mode

ERROR Vendor specific error					
VSE	CNT	Status Info1 (2000)		Status Info2 (0004)	
1F	02	00	20	04	00

Access non-existent parameter

ERROR Vendor specific error					
VSE	CNT	Status Info1 (2000)		Status Info2 (0002)	
1F	02	00	20	02	00

Access non-existent Temperature Controller

ERROR Vendor specific error					
VSE	CNT	Status Info1 (2001)		Status Info2 (0005)	
1F	02	01	20	05	00

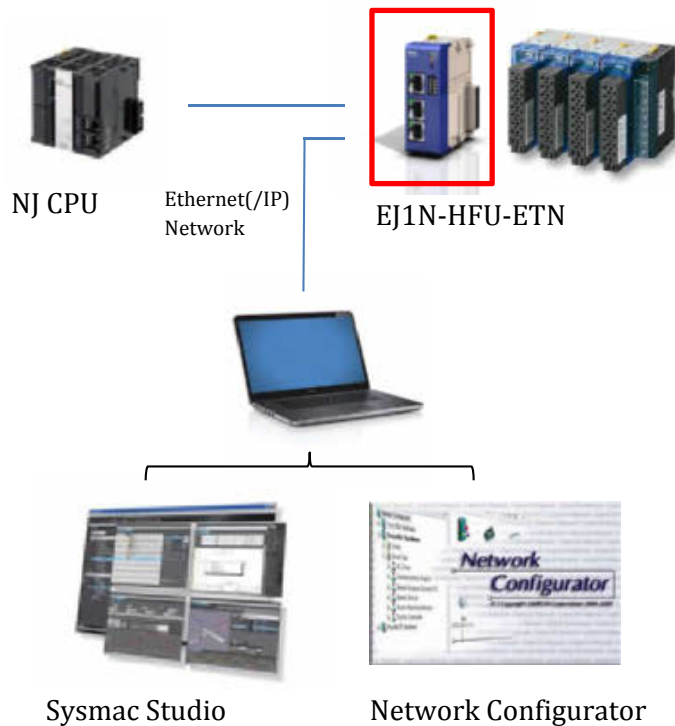
All other error codes are following Ethernet/IP interface specification. Please consult the Ethernet/IP master manual for details.

Appendix B Sample project: OMRON NJ Series - Sysmac Studio

This part of the document describes how to build a system using the OMRON NJ CPU Unit and Sysmac Studio software together with the EJ1N-HFU-ETN Unit for Ethernet/IP.

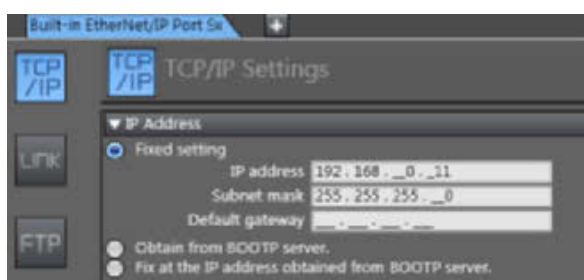
B.1 System overview

The following picture shows an overview of the setup.



B.2 Sysmac Studio

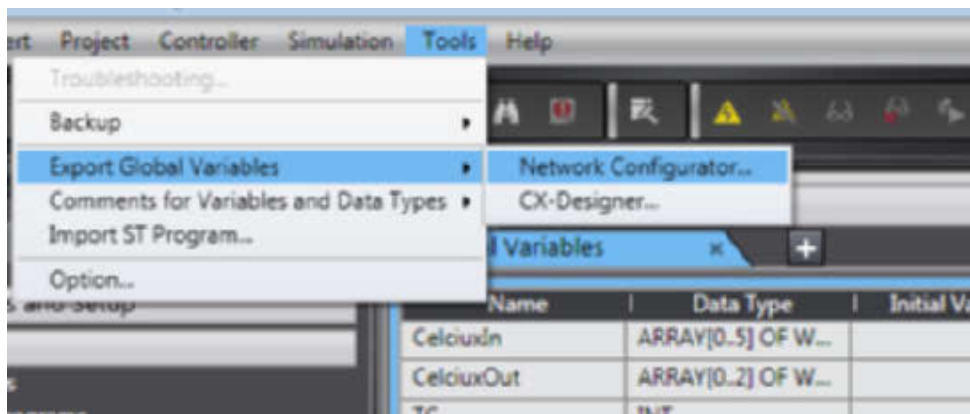
To use the integrated Ethernet/IP port the NJ CPU Unit must first have assigned a valid IP address using one of the allowed methods.



The cyclic (implicit) IO exchange mapping is read and written from two arrays (IN/OUT) of 16bit data declared in the global variables. These variables should be marked as *published* in the network for the EJ1N-HFU-ETN to be able to access them.

Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish
CelciusIn	ARRAY[0..5] OF WORD			☐	☐	Input
CelciusOut	ARRAY[0..2] OF WORD			☐	☐	Output
TC	INT			☐	☐	Input

The final step is to export these variables as a CSV file to allow them to be imported into Network Configurator as tag sets.



B.3 Network Configurator

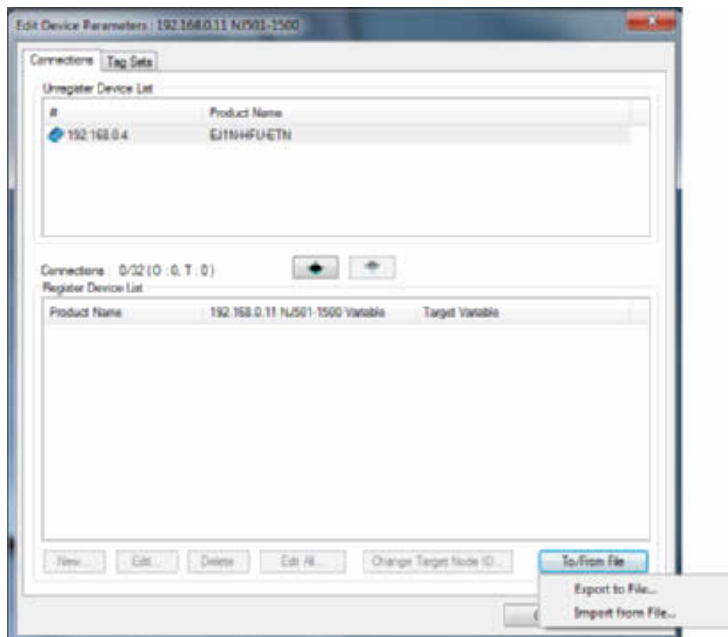
Once the Sysmac Studio project is ready it is time to setup the network and EJ1N-HFU-ETN parameters using OMRON Network Configurator.

It is possible to change the Unit's IP address. The option to do so is available under Tools > Setup TCP/IP Configuration option in the menus.



The next step is to configure the parameters of the EJ1N-HFU-ETN and the related Temperature Controllers. The section 3.6 Setting up the Unit for Ethernet/IP explains the detailed settings which will need to be configured:

Unit	
0001 #01 Unit	EJ1N-TC2A-QNH-B
0002 #02 Unit	EJ1N-TC2A-QNH-B
0003 #03 Unit	----
0026 TC Input Size	12
0027 TC Output Size	6
Input Area	
0029 IN Data 1	#01 ch1 Channel Status
0030 IN Data 2	#01 ch1 Channel Status
0031 IN Data 3	#01 ch1 Internal SP
0032 IN Data 4	#01 ch1 MV Monitor (Heating)
Output Area	
0229 OUT Data 1	#01 Operation Command
0230 OUT Data 2	#01 ch1 SetPoint
0231 OUT Data 3	#01 ch2 SetPoint
0232 OUT Data 4	#01 ch2 SetPoint
0233 OUT Data 5	#01 ch2 Proportional Band
0234 OUT Data 6	#01 ch2 Integral Time

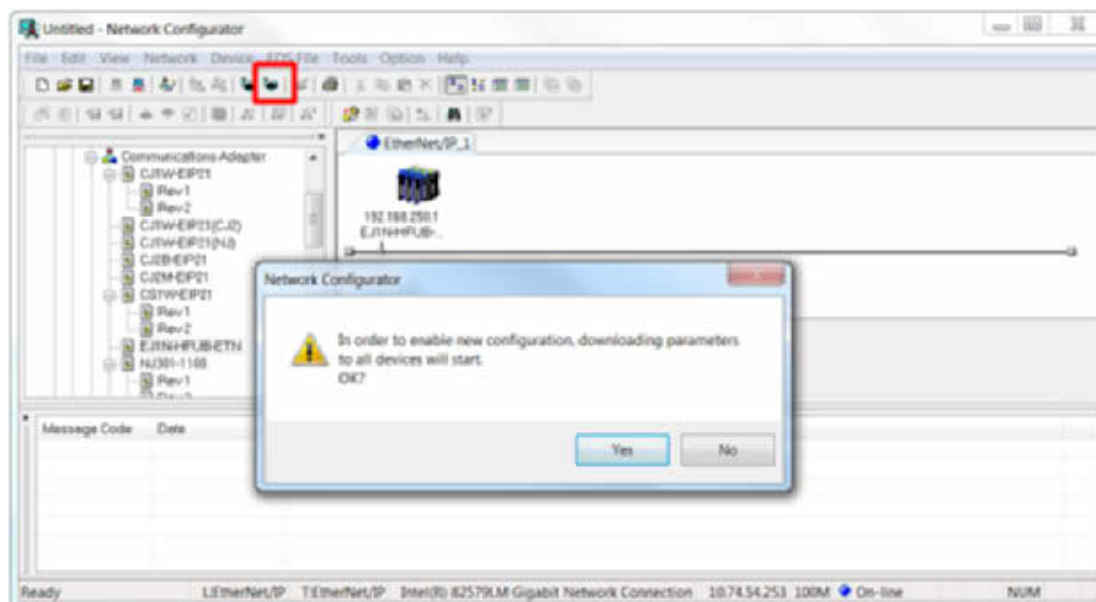


The final step implies the creation of the cyclic (implicit) connection. To do so it is necessary to import the network published variables from Sysmac Studio and let Network Configurator create the tags linked to the ones in the PLC.

Once the tags are imported it is possible to define the connection details such as where to map IN and OUT data and the RPI.



To finalize the setup, download (Computer to Network) the configuration to the EJ1N-HFU-ETN and the NJ PLC.

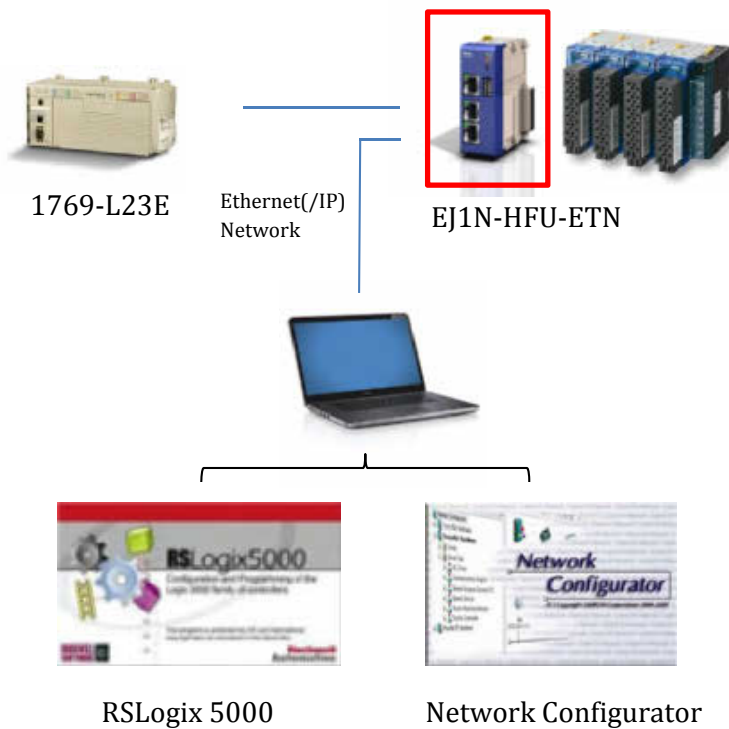


Appendix C Sample project: Rockwell CompactLogix – RSLogix 5000

This part of the document describes how to build a system using the Rockwell CPU (in this case the Compact Logix 1769/L23E) and RSLogix 5000 software together with the EJ1N-HFU-ETN Unit for Ethernet/IP.

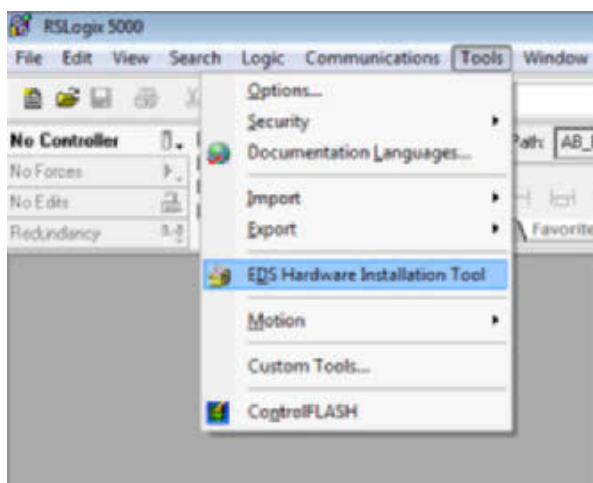
C.1 System overview

The following picture presents an overview of the setup.

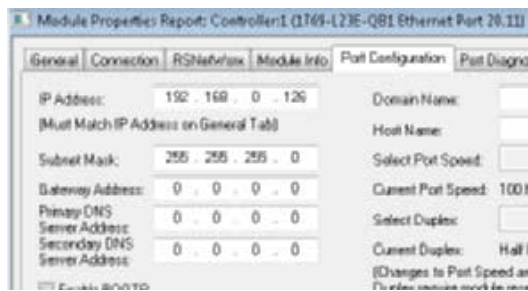


C.2 RSLogix 5000

The first step before using RSLogix 5000 is installing the EDS file.

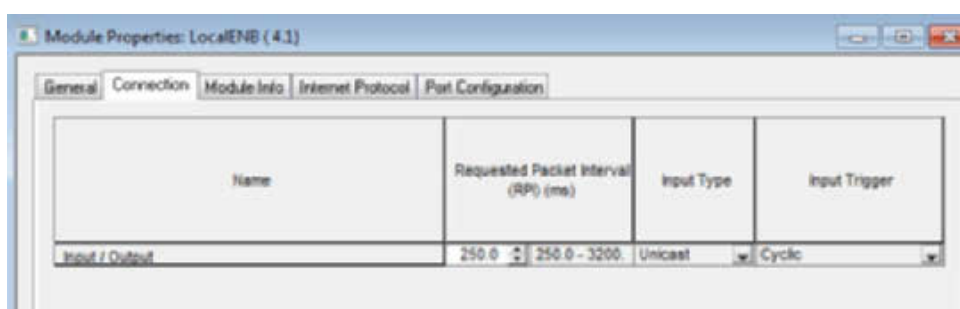
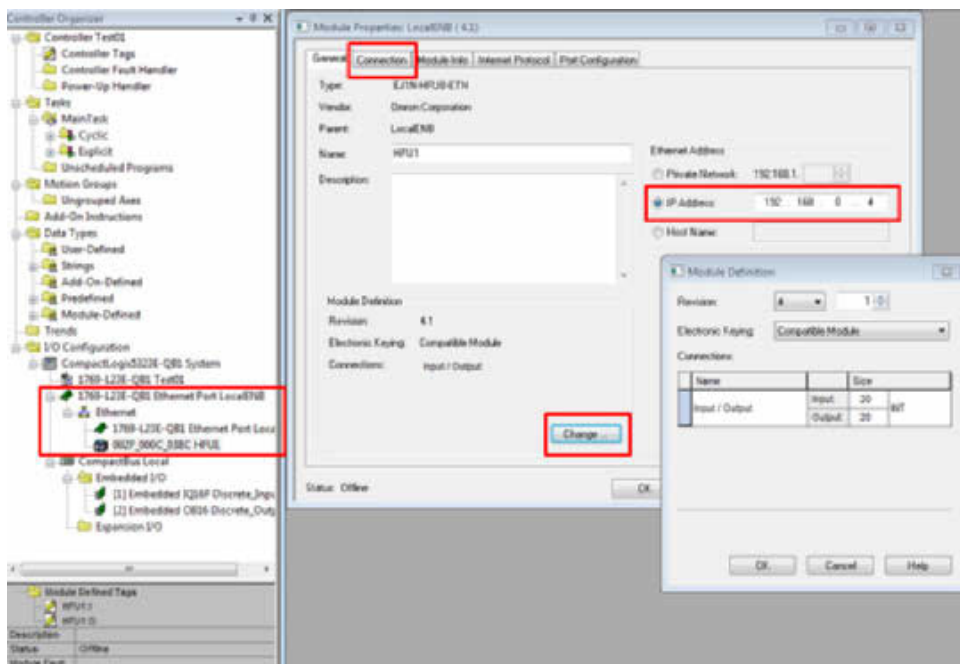


The integrated Ethernet/IP port must have a valid IP assigned.



The EJ1N-HFU-ETN can be added to the tree as a *new* device or it is possible to discover it online. Once the module is there it has to be commissioned, including:

- IP address of the module
- Cyclic (implicit) IN/OUT data sizes, mapped type and Packet Interval (RPI)



RSLogix environment creates the cyclic (implicit) data tags automatically.

Name	Alias For	Base Tag	Data Type	Description	External Access
ALWAYS_ON			BOOL		Read/Write
EmCrit			DINT		Read/Write
GoMap			BOOL		Read/Write
HFU1:I			_002F:000C_038...		Read/Write
HFU1:O			_002F:000C_038...		Read/Write

C.3 Network Configurator

Follow the same steps as with the OMRON NJ Controller. The only difference is that it is not necessary to download to the Ethernet/IP master, just to download the configuration to the EJ1N-HFU-ETN.



Authorized Distributor: